selected by Prof. Kapteyn for his "Plan of Selected Areas" (1906), the number of regions for which data were available for preliminary discussion being sixty-five at Harvard and eighty-eight at Mount Wilson. Dr. van Rhijn's discussion is much the more detailed, Prof. Seares dealing only with the numbers of stars down to the *limiting* magnitude on each plate. The two investigations agree, however, in indicating a progressive increase in the concentration of the stars towards the galactic plane, as we proceed from brighter to fainter stars. Comparing star densities (*a*) in a belt of 20° on either side of the galaxy, and (*b*) in the caps of 50° radius round the galactic poles, the ratio is found to be 2·5 for stars brighter than $5^{\mathrm{m}}\cdot0$ or $6^{\mathrm{m}}\cdot0$, 5·5 for stars brighter than $16^{\mathrm{m}}\cdot0$ (Harvard), and about 10 for those brighter than $17^{\mathrm{m}}\cdot0$ (Mount Wilson); magnitudes are here reckoned on the revised Harvard photographic scale.

These results differ to some extent from those arrived at by earlier investigators, among whom the more recent are Pickering (1903), Kapteyn (1908), and Chapman and Melotte (1914). The differences, however, can now, in the main, be accounted for. The counts on which the first-mentioned work was based were incomplete in the richer regions of the sky, and the galactic condensation thus appeared to increase but little for the fainter stars. Kapteyn's memoir, on the contrary, gave values of the condensation which are larger than those mentioned above, but which are brought into fair agreement with them when his magnitude scale is corrected to the absolute scale determined more recently. Chapman and Melotte's investigation, which was photographic (thirty plates), and in many respects similar to the new Harvard-Groningen study, gave too small a galactic concentration for the faint stars (*i.e.* 3·1 at $16^{\mathrm{m}}\cdot0$). Dr. van Rhijn points out that the method of reduction which they adopted was faulty, and would lead to too small a value; from a note in his memoir it appears that, after allowing for this error, Chapman and Melotte find that their data yield results in close accordance with his own.

It is of interest to note that Dr. van Rhijn's estimate of the total number of stars in the sky brighter than the 16th magnitude is approximately thirty-three millions. Also, if the law of increase in number which is obeyed down to this limit is used to obtain, by extrapolation, an estimate of the total number of stars of all magnitudes, the result is found to be 3360 millions; of these stars about half will be brighter than magnitude 25·5.

S. C.

ALCOHOL FUEL AND ENGINES.

THE special committee on "Alcohol Fuel and Engines" of the Australian Commonwealth Advisory Committee on Science and Industry has presented its first report. The need for such an investigation arises from the prospective shortage of supplies of mineral oils and the consequent high price of motor spirit.

There are three branches into which the inquiry divides, namely, the design and manufacture of the engine, the supply of the alcohol, and its denaturation. As the committee points out, there is no special difficulty with the engine; indeed, the use of alcohol, by permitting the compression ratio to be increased considerably, offers a prospect of some gain in thermal economy. Nor with a given engine need there be any loss of power, since the average calorific value per unit volume of a mixture of alcohol with the air necessary for its combustion is almost identical with the corresponding figure for petrol. Nevertheless, if alcohol be compared with petrol pound for pound, the latter has the advantage by some 50 per cent. A comparison gallon for gallon is more favourable to alcohol, but, whichever be adopted, alcohol needs to be at a lower unit price than petrol to be the more economical fuel.

Alcohol unfortunately suffers from the grave disadvantage that an engine will not "start up from the cold" with it, whereas its alternative rival, benzol, will easily enable this to be done on all but the very coldest days. Doubtless the possible use of benzol was outside the terms of the reference of this particular committee; but, had it not been so, the committee would certainly have had to point out that, although the alterations to the engine to suit it to alcohol as fuel are not considerable, the use of benzol enables the engine to be used without any alterations whatever.

The main difficulty seen by the committee is the question of supply. "It appears unlikely that any considerable quantity of alcohol can be manufactured in Australia from either waste or raw materials not at present utilised." The same remark applied to benzol before the war, but will it apply after? The quantity of benzol at present being produced for munitions is shrouded by the secrecy of war, but it is not out of place to speculate that when the need for vast munitions ceases a supply of benzol may be released for use in internal-combustion motors which will give a new aspect to the problem which this Australian committee is considering. The further reports of the committee will be looked forward to with interest.

NOTES.

Among the several matters which the deputation from the Joint Committee of Approved Societies and the Conference of the Amalgamated Society of Industrial Assurance brought before the Prime Minister, when he received it on October 11, not the least important was that with regard to the early establishment of a Ministry of Health. Mr. Lloyd George did not fail to recognise its importance, and in the reply which he made to the deputation showed that he was alive to the necessities of the case and understood the point of view of the deputation. In effect, the demand made was that, in connection with the establishment of the Ministry, the aim should be to give satisfaction to the national insurance organisations. It was suggested, too, that the one thing that must be done was to avoid allowing the Local Government Board to have any part in the work. The reason for asking this was that the Board dealt with pauperism, and insured persons and trade unionists were opposed to it, would not have anything to do with it, and, in short, hated it. As a matter of fact, this was probably all that the deputation desired to say as to the Ministry of Health, except to assure the Prime Minister that the bodies concerned with national insurance were much more capable and deserving of the honour of being charged with the care of the nation's health. Except that he may possibly have been hinting that it was the fault of the Local Government Board that the laws as to public health were not satisfactory, and that there had been no drastic reform in connection with their administration, the Prime Minister said very little in praise or dispraise of this department. If he had words of praise for the national insurance bodies as public health administrators they did not appear in the newspaper reports of the proceedings. From these it would seem that perhaps the most important statement made by Mr. Lloyd George, so far as the Ministry of Health was concerned, was not one likely to bring much cheer to persons desirous of seeing an early settlement of the question. The Prime Minister made it clear that he regarded the matter as important, and that he saw the necessity for drastic alterations. Also he made it plain that he did not think this was the time to ask that changes should be made. It appears to be his view also that even if there is postponement and the country is asked to depend upon the existing arrangements for even a year or two, probably nothing very serious will happen.

UNDER the Representation of the People Bill now before the House of Commons, it is proposed to do away with the Livery vote of the City of London. A meeting was held at the Guildhall on October 15 to protest against this proposal. The Lord Mayor presided, and Lord Halsbury moved the following resolution, which was seconded by Major Rigg and carried by the meeting:—"That the Livery Companies of the City of London, in common hall assembled, earnestly protest against the attempt now disclosed, under the provisions of the Representation of the People Bill, to deprive the Livery of one of its most valued and long-established rights and privileges in exercising the Parliamentary franchise in the City of London; and against the injustice and wrong at such a moment in our history of having to defend these rights; and they further submit that the provisions in the Bill for preserving and extending the university franchise should include the retention of the ancient Livery franchise on educational grounds alone, apart from the other rights of the Livery to its retention. The Corporation and the Livery Companies have from time immemorial represented the founders and supporters of all grades of education, including faculties in science and literature in the universities to which the Bill rightly proposes to preserve or give the Parliamentary vote, and have cherished and supported all forms of manual, industrial, commercial, and scientific training, based upon and combined with such education. The City and Guilds Institute and the schools and colleges founded and still maintained in the City of London constitute in themselves an educational claim to the Parliamentary franchise, based on traditional influence, contemporary activity, and prestige as great as can be claimed for any kindred constituency, and the Livery make their appeal to Parliament to preserve to them rights they have well earned and ever exercised in the public interest." A strong case can certainly be made out for the retention of the Livery vote on the ground of the educational activities of the Livery Companies of the City of London. To the City and Guilds of London Institute alone these companies and the Corporation have contributed more than one million pounds, and they led the way in the provision of facilities for technical education in London. Their historical claims to Parliamentary representation are undoubted, and they are supported by beneficial national influence. Whatever reasons can be adduced for university representation can be applied with increased force to the Livery franchise; we hope, therefore, that the ancient right will be preserved.

ONE of the industries concerning which little is perhaps generally known, but upon which the steel, non-ferrous metals, gas, glass, and other industries are absolutely dependent, is that which is concerned with the production of refractory materials. In the days before the war we were content to draw from abroad not only important supplies of raw materials, but also finished products. The new spirit in manufacturing, however, has led to a movement to make British industries particularly self-supporting in this direction. Mr. W. J. Jones, of the Ministry of Munitions, who is the president of the Ceramic Society, the autumn meeting of which concluded at Glasgow on October 3, in an address delivered to the Refractory Materials Section of that society, referred to the useful work which has been done by this section. He pointed out how the urgent needs of manufacturers for refractory materials have been met by the home industry, which, notwithstanding the depletion for national service of so many of the best men, has increased the output of coke-oven bricks by 100 per cent., of silica bricks by 60 per cent., of calcined dolomite by 80 per cent., and of firebrick by more than 20 per cent. In view of the fact that our manufacturing output must remain at a high level, both during the war period and after, Mr. Jones outlined the steps that should be taken to bring about the necessary increase in the supply of refractory materials of the right quality in order that they might withstand the high temperatures that would be certain to be applied, and the more severe conditions of service generally. What he asks is that there should be a closer combination between manufacturer and consumer, with the scientific investigator as a connecting link, and he urged upon all interested the desirability of at once giving consideration to a scheme of scientific research in which other societies are likely to cooperate. If the suggestions put forward by Mr. Jones commend themselves to the makers, and the necessary steps are taken to bring about their realisation, a great step forward will have been made by an industry which, although in a certain sense a subsidiary one, is intimately bound up with the future prosperity of our staple manufactures.

WE learn from the *Daily Telegraph* that President Poincaré has conferred the Legion of Honour upon Dr. John Cadman, C.M.G., professor of mining, University of Birmingham, in recognition of valuable services rendered by him in the cause of the Allies.

THE King has conferred the dignity of a peerage of the United Kingdom upon the Right Hon. Sir Francis Hopwood, vice-chairman of the Development Commission, and a member of the General Board and Executive Committee of the National Physical Laboratory.

WE regret to note that the *Engineer* for October 12 records the death of Mr. William Robert Sykes, the inventor of the lock-and-block system of railway signalling. Mr. Sykes died on October 2, at the age of seventy-seven years; he was responsible for the invention of many appliances relating to railway signalling.

THE death is announced in the *Engineer* for October 12 of Mr. Bernard Arkwright, chief of the engine works department at Elswick. Mr. Arkwright was born in 1861, and educated at Harrow, and he became assistant manager of the engine works belonging to Sir W. G.

Armstrong and Co., Ltd., at the early age of twenty-seven years. He was appointed a local director of the company in 1912, and was a member of the Institution of Civil Engineers and of the Institution of Mechanical Engineers. He occupied a prominent position in the North-East Coast Engineer Employers' Federation.

DR. ADDISON, the Minister of Reconstruction, has appointed a committee to consider and report on questions connected with the supplies of raw materials which will be required by British industries for the purpose of restoring and developing trade after the termination of the war and the best means of securing and distributing supplies, due regard being had to the interests of the Allies. The committee, which will be known as the Central Committee on Supplies of Materials, consists of the following members:—Sir Clarendon Hyde (chairman), Sir H. Birchenough, K.C.M.G., Mr. Cecil Budd, Sir C. W. Fielding, K.B.E., Sir H. Babington Smith, K.C.B., Mr. W. Thorneycroft, and Mr. A. Weir. The secretary is Mr. J. F. Ronca, who should be addressed at the Ministry of Reconstruction, 2 Queen Anne's Gate Buildings, Westminster, S.W.1.

IN discussing the development of the steel industry in Great Britain the leading article in *Engineering* for October 12 asks whether there are any signs during the last two years in the desire of our manufacturers to profit from scientific methods, and obtains a welcome affirmative from the recent autumn meetings of the Iron and Steel Institute and the Institute of Metals. There has always been great difficulty in getting British manufacturers to combine to solve collectively problems which affected all, and no better evidence that the "old order changeth" could be supplied than the report of Committee No. 1 on ore, fuels, and refractories, with which the Iron and Steel Institute opened its session. This report was compiled by Messrs. Guy Barrett (Ebbw Vale) and T. B. Rogerson (Glasgow), and gives in an admirably concise form the present state of our knowledge regarding the subjects dealt with, and received warm commendation from the members. In connection with the utilisation of low-grade ores, concentration will be required to convert these into high-grade ores, while briquetting will be necessary to make the product usable. Meanwhile there is money to be saved, the conservative estimate of the authors of the report being more than 5000*l*. per furnace-year.

THE *Revue Scientifique* records the death on July 22 last of M. François Cyrille Grand'Eury, correspondant of the Institute of France in the section of botany. Born at Houdreville (Meurthe-et-Moselle) on March 9, 1839, Grand'Eury adopted the profession of a mining engineer, and spent his life in the coalfields. Early in his career he became interested in the fossil plants occurring in and around the coal-seams, and he continued until the end to make the best use of his unrivalled opportunities for observing the fossils in their natural position. He was thus able to make many important contributions to knowledge of the flora of the Carboniferous period, by correlating the roots, stems, foliage, and fruits, which were until then known only by isolated fragments and bore several distinct names. At the same time he made many striking observations in reference to the mode of origin of the coal-seams themselves. There are still differences of opinion as to some of his theories and deductions, but all are agreed as to the keenness of his insight into the problems before him and the success with which he helped to solve many of them. His numerous writings are beautifully illustrated, and will always be esteemed among the early classics of palæobotany. His memoir on the Carboniferous flora of the department of the Loire and the centre of France was published by the Academy of Sciences so long ago as 1876. His great work on the coal basin of the Gard appeared in 1890. At the time of his death he had begun the publication of "Recherches géobotaniques," in association with his only son, who has fallen in the war.

LT.-COL. GODWIN AUSTEN writes with reference to the late Capt. G. F. T. Oakes, R.E.:—"I have only very recently heard of the death of this promising young engineer officer, which took place so long ago as July 15 last year at Ovilliers la Boiselle, when urging his men to complete a communication trench. Educated at Dulwich College, he entered Woolwich in September, 1900, and obtained his commission in December, 1901. Proceeding to India in 1904, he was appointed to the Indian Survey Department, and saw active service in the Abor Expedition of 1911–12, was mentioned in despatches, and received the medal and clasp. He did some fine work in this then unknown part of the Eastern Himalaya, in the great valley of the Dehang (the Tsanspu of Tibet, the Brahmaputra of Assam), carrying the triangulation and topography for 100 miles up the course of that great river to lat. 29° N., long. 95° E., including the great tributaries of the Siyom and Shimang on the right bank, with the Yamne on the left bank. The trigonometrical stations are lofty, up to 11,000 and 12,000 ft., covered with dense tropical forest, climatic and transport difficulties are great, and the people of the country wild; this survey he continued for another season after the troops had retired. Capt. Oakes did, besides, much for zoology, and I shall ever be grateful to him for the fine collection of land Mollusca he brought together; many rare species reached this country alive, and lived through the summer. This material, together with what was collected by Mr. S. W. Kemp, of the Indian Museum, during the Abor Expedition, shows that a very distinct molluscan fauna has developed in the Tsanspu valley, throwing much light on its ancient geological history and course. The Surveyor-General of India has lost a most promising assistant, and the Royal Engineers a brave officer, one who, on the return of peace, would have taken part in future pendulum survey operations in India, for which he was well fitted."

RAINFALL and gunfire is the subject of a note by Dr. H. Deslandres, director of the Meudon Astrophysical Observatory, in the *Comptes rendus* of the Paris Academy of Sciences for August 27. A communication is included from the pen of M. C. Saint-Saëns, whose eminence in the world of music serves him as a passport into the realms of science. The composer relates that in the time of Louis Philippe the evening display of fireworks which terminated the national festival of the "Trois Glorieuses" in July at Paris had to be helped out by the discharge of ordnance with the view of increasing the noise, which was otherwise insufficient to satisfy the public; and that afterwards there was nearly always a heavy storm, although the afternoon was the usual time for such phenomena. M. Saint-Saëns is of opinion, however, that rain is only produced by gunfire in certain circumstances (which are not specified). Dr. Deslandres maintains that gunfire is never the primary cause of rainfall, but that it may serve to provoke, expedite, and increase precipitation. In the latter part of the note the author remarks that the statements of Pliny and Plutarch to the effect that great rains followed great battles in ancient times, long before the invention of explosives, may not be without foundation; he considers that the friction of javelins, arrows, stones, and other missiles may have been sufficient to effect an increased ionisation of the air, and thus by facilitating condensation to bring about premature or excessive rainfall. M. Angot, however, has recently pointed out that the lower regions of the atmosphere are always highly ionised, and that it has yet to be proved that any addition of ions can excite premature condensation in unsaturated air (see NATURE, August 9, p. 467).

AN extraordinary feat of engineering is reported from America in the *Times* for October 10, under the heading "A Standardised Air-engine." Our American friends seem to have realised at the outset the inadvisability of using a number of engines of different design, and have sought to standardise an engine from the first. With this object in view, two eminent engineers, whose names have not yet been disclosed, were invited to meet and discuss the question of an all-American engine, embodying the best experience available on engine design. Manufacturers and consulting engineers have also co-operated, and, we are told, have patriotically given up trade secrets to assist in the new design. The work of designing and constructing a trial engine was completed in the amazingly short space of one month, and the new engine was run in Washington on Independence Day for the first time. The United States *Official Bulletin* of September 13 states that the tests have given complete satisfaction, and even goes so far as to say that the tests "justify the Government in accepting the engine as the best produced in any country." This is high praise indeed for an engine so rapidly designed and made, and motor engineers will await details of the design with considerable interest. Little is said in the *Official Bulletin* as to the details of the new engine. Standardisation is the keynote of the design, and the cylinders have been so arranged that engines having either eight or twelve cylinders can be built from the same standard parts. It is, of course, impossible to criticise the engine from a technical point of view with so little definite information, but the Americans are to be congratulated upon their early appreciation of the importance of a standard engine, and the immense amount of time in production and repair that can be saved by adopting such a design.

IN a circular letter received from the Decimal Association, and headed "The Breakdown of the Penny," a proposal is again put forward for the establishment of a system of decimal coinage based on the sovereign, or pound sterling, which would retain its present name and value, and would represent "1000 mils." It is pointed out that most of our existing coins down to and including the sixpenny-piece are available for incorporation in such a system without any alteration whatever in their respective values, and that the completion of the system by the division of the florin into 100 parts would involve only a slight modification in the values of our present bronze coins. The circular states that war-time conditions have completely changed the purchasing power of the penny, that the inflexibility of our subsidiary coinage has been one of the causes accentuating the high prices of daily necessities, which have been found to be the root of so much industrial unrest, and that the proposed changes will be of advantage to the industrial classes. Prices of halfpenny goods have in many instances been raised to a penny and those of penny goods to three-halfpence for lack of coins having values intermediate between our present halfpenny and penny and between the penny and three-halfpence. The provision of an enlarged range of low denomination coins in closely graduated steps would accordingly afford much relief to purchasers while enabling the seller to get a fair increase of price for his article. A table of the proposed decimal coinage, given in a pamphlet accompanying the circular, shows that the new coins introduced would be nickel pieces of 10, 5, and $2\frac{1}{2}$ mils, and, if necessary, bronze pieces of 4, 2, and 1 mils.

THE annual report for 1916 of the Agricultural and Horticultural Research Station, Long Ashton, Bristol (the National Fruit and Cider Institute), forms an interesting record of work continued under great difficulties owing to depletion of staff. Cider and apple investigations form, as usual, the most prominent feature of the report, whilst several questions relating to black currants have also been studied. In addition to the staple research work of the station a number of questions which have arisen out of war-time conditions have been investigated, including experiments on the utilisation of cider apples and apple pomace as food for live stock and the substitution of glucose for cane-sugar in jam-making.

THE *Bulletin of the Imperial Institute* (vol. xv., No. 1) gives an account of the results of examination of *Ecdeiocolea monostachya* "leaves" from Western Australia, *Neoboutonia macrocalyx* timber from the East Africa Protectorate, and bark of *Brachystegia Randii* from Rhodesia, which have been investigated at the institute recently as sources of pulp for paper-making. The results on the whole were such as to indicate that these materials could be satisfactorily employed for the purpose. A further addition to the valuable information on oil-seeds supplied by the institute is given in articles on manketti nuts, babassu kernels, tucan nuts, and Paraguay kernels. In an article on the production of wheat in Egypt Mr. G. C. Dudgeon, of the Ministry of Agriculture, arrives at the conclusion that, except in years when the cotton crop is largely restricted in area, Egypt cannot grow enough cereals to supply completely her own necessities. Other reports, articles, and notes, covering a wide variety of subjects, contribute to make an interesting number.

IN his address to the Physical and Chemical Section of the Franklin Institute in January last Prof. Millikan, of the University of Chicago, dealt with one of the unsolved problems of modern physics—the relation of the electron to the absorption and emission of radiation. The fact that short-wave radiation passes through matter without influencing more than one in a thousand billions of the atoms in the space traversed forces us to assume either that the energy of the radiation is not spread evenly over the wave front, or that there is some property of the atom which, while permitting it to take in energy from the radiation gradually, only admits of that energy being emitted in bundles or "quanta." The former alternative has been adopted by Thomson and by Einstein, but Millikan points out the objections to it, and is disposed to think the second alternative the more promising, although in its present state it leaves us in the dark as to the conditions which exist within the atom and the modification of them that the incident radiation brings about. Prof. Millikan's address is reproduced in the September number of the Journal of the institute.

TWO $1\frac{1}{2}$-metre comparators, complete with the necessary standards, have recently been completed and shipped for the Imperial Japanese Government. The object of these comparators is to enable the final standards of length, as used by our Japanese Allies, to be comparable with those in use at the National Physical Laboratory at Teddington. The supreme importance of accurate final standards, from the point of view of interchangeability of ordnance, is universally recognised. The standards themselves are divided in metric units, and consist of H-shaped bars of 58 per cent. nickel-steel with platinum-iridium divided surfaces. In their general method of construction, all comparators consist of a heavy cast-iron base, on the back of which micrometer microscopes are fixed. The bars, to be compared, are mounted in a moving carriage, which is traversed to and fro beneath the microscopes, thus enabling *plus* and *minus* difference readings to be taken. In this case the moving carriage consists essentially of a double tank mounted on wheels. The two standards are carried on light beams in the inner tank, which beams are fitted with accurate levelling screws. The inner tank is filled with water, so as to maintain the standards at a constant temperature, whilst a complete system of thermometers enables the temperature accurately to be determined. The outer tank acts as a jacket to the inner. By filling the interspace with ice, or, alternatively, hot water, coefficients of expansion can be obtained to a high degree of accuracy. In the general design and in the supply of the detail fittings, the utmost precautions have been taken to eliminate small sources of error, and an accuracy of about ±0·1 μ is anticipated after final erection. These instruments were constructed by the Société Genevoise, of 87 Victoria Street, London, and Geneva, to the specification of Mr. O. Paul Monckton.

THE September number of *La Science et la Vie* contains a description of the stereoradioscope invented by Major Lièvre, of the French Army Medical Corps. The principle of the apparatus is as follows. A body acted upon by the Röntgen rays emanating from two different sources distant from 6 to 10 centimetres from each other projects two parallel shadows on to the screen. If by a suitable arrangement the right eye is made to see only one of the images at the same time as the other image is seen by the left eye only, an observer will have a stereoscopic view of the radioscopic image. To dissociate the two images in this manner and render each visible to the corresponding eye, Major Lièvre has applied the principle of the persistence of luminous impressions on the retina. The apparatus itself consists of three essential parts superposed, viz. a double source of X-rays underneath, followed by the usual screen, then a sighting device provided with a shutter and a commutator. The commutator serves the purpose of operating one of the X-ray tubes simultaneously with the uncovering of one of the eyepieces, and of shutting off the other X-ray source and closing the shutter of the other eyepiece. The device, which has been adopted by the French Army, has the advantage of great mechanical simplicity and ease of application.

THE problem of the landing of an aeroplane in the shortest distance and with the minimum of shock is a very important one in aviation, especially with the advent of the heavier machines of the bombing type. In a very interesting article in the September number of *La Science et la Vie* M. Jean Fontanges deals with the question, and describes the systems of landing carriage employed on various French and German machines. The type of carriage provided with skids only is now practically obsolete, the most usual pattern consisting either of wheels alone, or wheels in conjunction with skids, or a rear crutch. The centre or supporting wheels have to be built on a high-strength framework (usually of steel tubing), with (smaller) front wheels to prevent the machine landing nose down. Some of the types are provided with brakes on the wheels, to give quicker landing. Mention is made of the Paul Schmitt biplane, which is provided with a device for altering the incidence of the wings and so reducing the speed of the machine prior to landing. The article also discusses the types of shock-absorber usually employed.

MR. G. BURTON BAKER contributes to the *Chemical News* for September 21 an interesting note on a colouring matter extracted from Wasahba wood. The latter has a specific gravity 1·214; it is difficult to work, being extremely hard and almost bony in texture. When the sawdust is extracted with hot alcohol a colourless solution is obtained which becomes a bright salmon-pink when treated with an alkali solution, the colour being discharged by acids. If the alcoholic extract is used side by side with a one per cent. solution of phenolphthalein in the titration of ammonia, potassium hydroxide, and sodium hydroxide solutions with hydrochloric acid, the same result is obtained in the case of potassium hydroxide as with phenolphthalein, whilst with ammonia and sodium hydroxide the results were approximately the same. Concordant results could not be obtained when sodium, potassium, and ammonium carbonates were the alkalis employed. Further, the red alkaline solution will act as a dye, staining white pine quite deeply.

THE issue of *Engineering* for September 21 contains an account of the hydraulic power undertakings connected with the town of Barcelona and its electric supply. Under the control of the Barcelona Traction, Light, and Power Co. there has been inaugurated a threefold development of the hydraulic resources of the adjacent country. Power accessible to the extent of 60,000 h.p., under a head of 164 ft., is already obtained from the river Segre, from Lerida downwards for a distance of 18½ miles. By the formation of a dam, 262 ft. high, a reservoir has been formed on the river Noguera Pallaresa, giving a head of 492 ft., from which two power stations of 50,000 and 60,000 h.p. respectively are supplied. The river Ebro is to yield the third quota, a dam 1378 ft. long and 197 ft. high being contemplated, and this will enable its power station to develop no fewer than 300,000 h.p. The Noguera Pallaresa dam has only recently been completed. It impounds a volume of 6,909,000,000 cub. ft. It is constructed across the narrowest part of the valley and is curved to a radius of 984 ft. The dam is a gravity dam, with a volume of 9,500,000 cub. ft. The Tremp power-house is situated about half a mile below the dam, and has four turbines, which run under a maximum head of 229 ft. and a minimum head of 98 ft.

MR. HUMPHREY MILFORD, of the Oxford University Press, announces "Studies in the History and Method of Science," edited by C. Singer. It will contain the following contributions:—"The Scientific Views and Visions of St. Hildegarde," C. Singer; "Vitalism," Dr. J. W. Jenkinson; "A Study in Early Renaissance Anatomy," C. Singer; "The Blessing of Cramp Rings," R. Crawford; "Dr. John Weyer and the Witch Mania," E. T. Withington; "The 'Tractatus de Causis et Indiciis Morborum,' attributed to Maimonides," R. Levy; "Scientific Discovery and Logical Proof," F. S. Schiller. Mr. Milford will also publish "The Determination of Farming Costs," by C. S. Orwin.

THE October list of Publishers' Remainders of Mr. H. J. Glaisher, 55 Wigmore Street, W.1, is miscellaneous in character, and should be seen by those in search of books in new condition at low prices. Among the books likely to be of interest to readers of NATURE are Sir F. Galton's "Memories of My Life"; "The Life of Sir Joseph Banks"; "The Life and Work of Prof. C. Pritchard"; and "Eleanor Anne Ormerod: Autobiography and Correspondence," all of which are listed at a very low figure. The "Library of Useful Knowledge"—a series of shilling volumes—is offered at half-price.